Twelfth Census of the United States.

CENSUS BULLETIN.

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AGRICULTURE.

ARIZONA.

Hon. WILLIAM R. MERRIAM,
Director of the Census.

SIR: I have the honor to transmit herewith, for publication as a census bulletin, a report on the agriculture of Arizona. It is based upon information obtained by enumerators, special agents, and correspondence. The enumerators secured statements of the resources, products, and conditions as to irrigation of farms, from the proprietors, and were assisted by special agents appointed to procure statistics of live stock on the public domain or ranges. Special reports as to the dimensions and cost of the leading irrigation ditches and canals, the area of land under them, methods for the artificial application of water to the growing crops, and other facts relating to irrigation, were obtained by correspondence with farmers, engineers, and others. This correspondence was under the joint direction of Mr. F. H. Newell, chief hydrographer of the Geological Survey, acting as expert special agent in the division of agriculture, and Mr. Clarence J. Blanchard.

The enumerators of 1900 were instructed to collect the same facts concerning the agriculture of the Indians as for that of other races. The facts for the Indians of Arizona have been tabulated and are embodied in this bulletin. In some respects the report and the enumeration on which it is based are less perfect than for the people of other races. In three or four reservations the enumerators did not make individual reports of all the Indian cultivators of the soil, but, instead, grouped them and made reports of their total agricultural holdings and operations. Therefore, the number of Indians engaged in agricultural pursuits is not stated with entire accuracy. This is also true of the size of farms and the number of domestic animals, as far as they relate to two or three reservations. It is believed, however, that the total product and wealth of the Indians in the territory are recorded with sufficient accuracy to be of much value.

The Tenth and Eleventh censuses presented statistics of the number of farms, classified by tenure. The Twelfth Census gives the same class of statistics, and, in addition, presents the data for each tenure by race or color of farmer. It also gives the leading facts of farm areas, values, and expenditures, and averages for the same, by race and tenure.

In presenting statistics of farm tenure the Tenth and Eleventh censuses divided farms into 3 groups: (1) Those cultivated by their owners; (2) those rented for money or a fixed quantity of farm products; (3) those rented for a share of the products. Of these classes the second and third have been retained unchanged by the Twelfth Census, but the first has been subdivided into 4 classes. The 6 groups of farms classified by tenure are these: (1) Farms cultivated or operated by individuals who own all of the land therein; (2) farms cultivated or operated by individuals who own a part thereof and rent the remainder from others; (3) farms cultivated or operated under the joint direction and by the united labor of two or more individuals, one of whom owns the farm or a part of it, and the other who, owning no part, receives for his supervision or labor a share of the products; (4) farms cultivated or operated by individuals who receive for their supervision and other services fixed salaries from the corporations, firms, or individuals who own such land; (5) farms rented for money or a fixed quantity of farm products; and (6) farms rented for a share of such products. For use in the tables the 6 classes are briefly designated as follows: (1) Owners, (2) part owners, (3) owners and tenants, (4) managers, (5) cash tenants, and (6) share tenants.

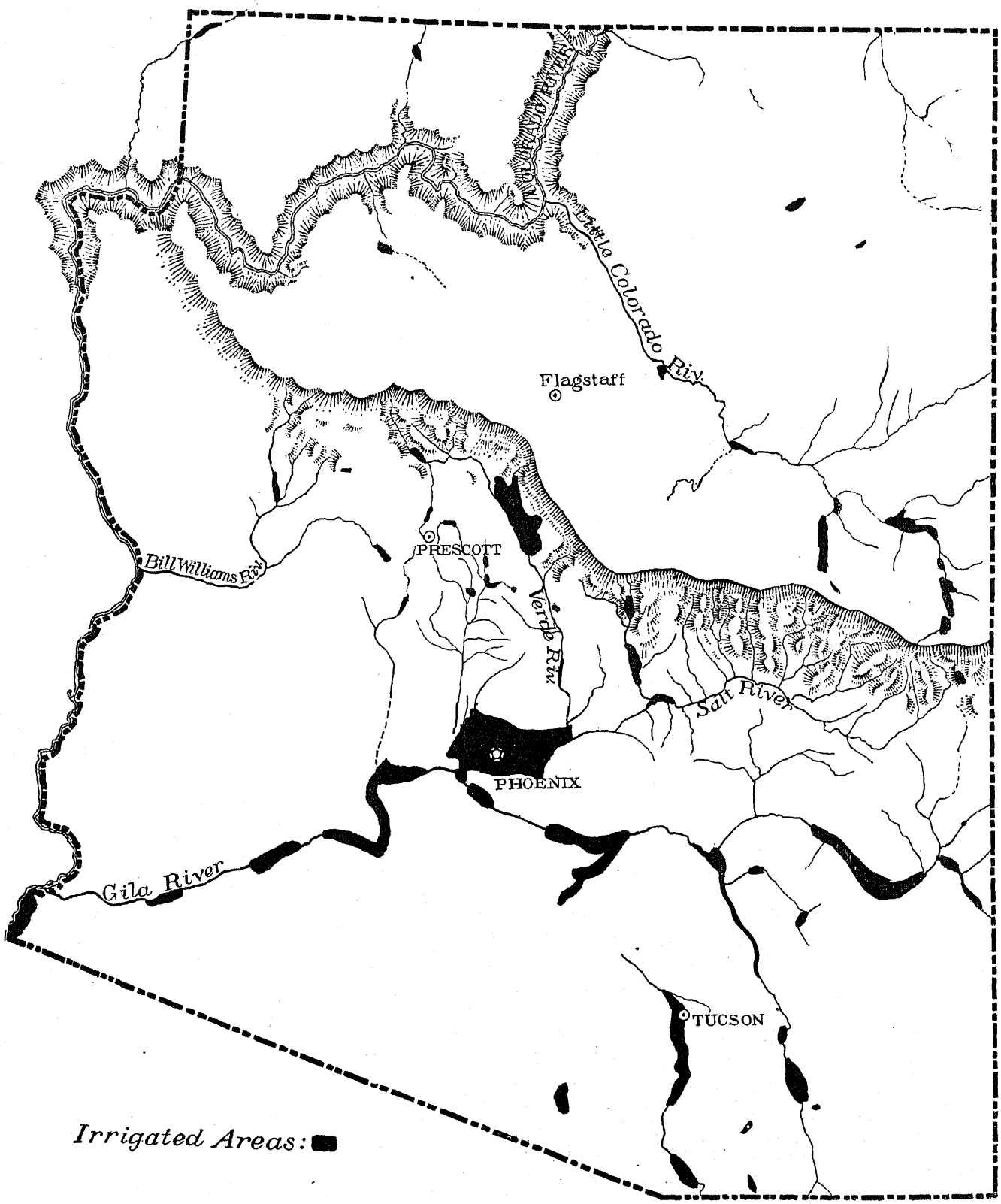
Very respectfully,

L. G. Powers.

Chief Statistician for Agriculture.

ARIZONA.

SKETCH MAP OF IRRIGATED AREAS AND MAIN TOPOGRAPHIC FEATURES.



AGRICULTURE IN ARIZONA.

GENERAL STATISTICS.

THE IMPORTANCE OF AGRICULTURE.

By the Census of 1890 agriculture in the territory of Arizona ranked second to mining in the proportion of one to seven. Although the present value of the mineral product of the territory is not known, it is observed that the value of all agricultural products in 1899 about equaled the value of all mineral products in 1889, and therefore it is probable that the relative importance and value of agricultural products have increased in the decade rather than diminished.

FARMS AND FARM AREAS.

Arizona was organized as a territory in 1863, and the statistics of agriculture were first published in the Ninth Census, the first to be taken after its organization. The following table summarizes by decades the increase in the number of farms and acres of farm land:

TABLE 1.—FARMS AND FARM ACREAGE.

CENSUS YEAR.	Number of farms.	NUMBER OF ACRES IN FARMS.				Per cent of farm land improved.
		Total.	Improved.	Unimproved.	Average.	
1900 a	5,809	1,935,327	254,521	1,680,806	333	13.2
1900 b	4,040	1,891,985	227,739	1,664,246	468	12.0
1890	1,426	1,297,033	104,128	1,192,905	910	8.0
1880	767	135,573	56,071	79,502	177	41.4
1870	172	21,807	14,585	7,222	127	66.9
PER CENT OF INCREASE BY DECADES.						
1890–1900 b	183.3	45.9	118.7	39.5	.....	.....
1880–1890	85.9	856.7	85.7	1,400.5	.....	.....
1870–1880	345.9	521.7	284.4	1,000.8	.....	.....

As the present census is the first to report upon the agriculture of the Indians in connection with that of other races, two series of figures are given in Table 1 and elsewhere, for 1900. The series marked "a" includes, and the one marked "b" excludes, the statistics of Indian farms. For comparative purposes the latter is more significant.

Excluding the Indians, the number of farms reported in 1900 is about twenty-three times, and the acreage of improved farm land fifteen times, as great as in 1870. In the ten years since 1890 the farmers have more than doubled the area of their improved land, and have started more new farms than all that had been established prior to that year. The relative increase in acreage of improved land is greater than that of unimproved.

Under the general title "Farms" are included not only such tracts of tilled and untilled land as are commonly designated by that word in the older-settled states, but also the ranches of the owners of flocks and herds. Of the latter there are many in Arizona. The proprietors of some of these ranches own large tracts of land, upon which cattle and sheep are fed, while others, who own little or no farm lands, subsist their flocks and herds, often exclusively, upon the public domain or range. The land and agricultural resources of such ranches are classed as farms, when of sufficient importance to require in their management the continued labor of one or more persons.

FARM RESOURCES AND PRODUCTS.

Table 2 gives, in the first column, the value of all farm resources reported for each census year. In the next two columns are presented the values of certain specified parts of those resources, and in the column headed "Products not fed to live stock," the income of the farms for the crop year preceding the census. As explained in footnotes, the several figures in this column are not entirely comparable, but sufficiently so to warrant bringing them into relation.

TABLE 2.—VALUE OF FARM RESOURCES AND PRODUCTS.

CENSUS YEAR.	Land, improvements, implements, and live stock.	Land with improvements.	Implements and machinery.	Products not fed to live stock.	Per cent of increase in value of farm resources.
1900 a	$29,906,877	$13,682,960	$765,200	$6,179,397	.....
1900 b	27,961,264	13,088,550	697,285	5,980,642	161.9
1890	10,676,470	7,222,230	196,580	[1] 1,045,970	347.7
1880	2,384,746	1,127,946	88,811	[1] 614,327	632.8
1870	325,441	161,340	20,105	[2] 277,998	.....

[1] Estimated value of all farm products.
[2] Estimated value of all farm products, including betterments and additions to live stock.

In the last decade farm wealth increased 161.9 per cent, and the value of implements and machinery increased even more rapidly. The value of products not fed to live stock, as reported in 1900, was 5.7 times as great as that reported for all products in 1890. A part of this great apparent increase is probably due to the greater completeness and accuracy with which products and their values have been reported for the present census.

FARMS CLASSIFIED BY RACE AND TENURE.

Table 3 gives the distribution of the 5,809 farms reported in 1900, according to race of persons conducting them and character of tenure. It presents also the percentage of the several sorts of tenure among the white and colored farmers.

TABLE 3.—NUMBER OF FARMS, CLASSIFIED BY RACE AND TENURE, JUNE 1, 1900, WITH PERCENTAGES.

PART 1.—NUMBER OF FARMS OF SPECIFIED TENURES.

RACE.	Total number of farms.	Owners.	Part owners.	Owners and tenants.	Managers.	Cash tenants.	Share tenants.
The Territory.	5,809	4,784	191	10	335	300	189
White	4,006	3,015	191	6	331	278	185
Colored	1,803	1,769	.....	4	4	22	4
Chinese	18	2	.....	.....	.....	16	.....
Indian	1,769	1,755	.....	4	1	5	4
Negro	16	12	.....	.....	3	1	.....

PART 2.—PERCENTAGES OF FARMS OF SPECIFIED TENURES.

The Territory.	100	82.3	3.3	0.2	5.8	5.2	3.2
White	100	75.3	4.8	0.1	8.3	6.9	4.6
Colored	100	98.1	.....	0.2	0.2	1.3	0.2
Indian	100	99.2	.....	0.2	0.1	0.3	0.2

Of the white farmers 11.5 per cent rent their farms for cash or on shares, 8.3 per cent manage them for wages, and 80.2 per cent own all or part of the land which they cultivate. Of the Indians the per cent of owners in whole or part is 99.4.

In Table 4 the figures for tenure for 1880 and since are given, together with the per cent belonging to each of 3 groups. For this table the data for 1900 relating to the first 4 groups of Table 3 are consolidated under the designation "owners."

TABLE 4.—NUMBER AND PERCENTAGES OF FARMS OF SPECIFIED TENURES IN 1900, 1890, AND 1880.

CENSUS YEAR.	NUMBER OF—			PERCENTAGES.			
	Owners.	Cash tenants.	Share tenants.	Total.	Owners.	Cash tenants.	Share tenants.
1900 (a)	5,320	300	189	100	91.6	5.2	3.2
1900 (b)	3,560	295	185	100	88.1	7.3	4.6
1890	1,313	51	62	100	92.1	3.6	4.3
1880	666	42	59	100	86.8	5.5	7.7

This table shows a slight decrease since 1880 in the per cent of share tenants, and a small increase in that of owners and cash tenants.

Table 5 gives, by race or color of farmer, and by tenure, June 1, 1900, the total number of farms, number of acres, and value, and percentage of the total which belongs to each class of farmers. Table 6 presents for the same groups the average value of the several forms of farm property, June 1, 1900, and of the products of 1899 not fed to live stock.

TABLE 5.—NUMBER AND AREA OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER, AND BY TENURE, WITH PERCENTAGES.

RACE OF FARMER, AND TENURE.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUE OF FARM PROPERTY.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
The Territory...	5,809	100.0	1,935,327	100.0	$29,906,877	100.0
White	4,006	69.0	1,889,376	97.6	27,846,550	93.1
Chinese	18	0.3	599	.....	36,759	0.1
Indian	1,769	30.4	43,342	2.3	1,945,613	6.5
Negro	16	0.3	2,010	0.1	77,955	0.3
Owners	4,784	82.3	419,344	21.7	16,578,658	55.4
Part owners	191	3.3	103,097	5.3	2,459,616	8.2
Owners and tenants	10	0.2	676	.....	27,573	0.1
Managers	335	5.8	1,354,854	70.0	8,897,021	29.7
Cash tenants	300	5.2	33,692	1.8	1,306,530	4.4
Share tenants	189	3.2	23,664	1.2	637,479	2.2

TABLE 6.—AVERAGE VALUES OF FARM PROPERTY AND PRODUCTS, CLASSIFIED BY RACE OF FARMER, AND BY TENURE.

RACE OF FARMER, AND TENURE.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.					Products of 1899 not fed to live stock.
	Total.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.	
The Territory...	$5,148	$1,965	$390	$132	$2,661	$1,004
White	6,951	2,694	555	173	3,529	1,483
Chinese	2,042	1,541	197	117	187	1,419
Indian	1,100	319	17	38	726	112
Negro	4,872	2,094	397	146	2,235	851
Owners	3,465	1,313	301	114	1,737	672
Part owners	12,878	6,614	673	268	5,323	3,697
Owners and tenants	2,757	910	158	133	1,556	628
Managers	26,558	8,063	1,603	312	16,580	5,633
Cash tenants	4,355	2,367	303	130	1,555	755
Share tenants	3,373	2,391	350	133	499	728

Of the negro farmers 3 operate their farms as salaried managers; 12 own farms containing 1,511 acres, with farm property valued at $60,422; and one leases for cash his farm of 39 acres, with implements and live stock worth $130. The total investments by negroes in agriculture, exclusive of farms owned by them and leased to others, is therefore $60,552.

FARMS CLASSIFIED BY AREA.

By the Twelfth Census farms are grouped, according to their area, in 10 classes. In Tables 7 and 8 are given, for farms so classified, the facts shown in Tables 5 and 6 for farms grouped by race and tenure.

TABLE 7.—NUMBER AND AREA OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY AREA AND PRINCIPAL SOURCE OF INCOME, WITH PERCENTAGES.

CLASS OF FARMS.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUE OF FARM PROPERTY.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
The Territory	5,809	100.0	1,935,327	100.0	$29,906,877	100.0
Under 3 acres	814	14.0	1,629	0.1	2,375,551	8.0
3 to 9 acres	718	12.4	4,738	0.3	497,751	1.7
10 to 19 acres	506	8.7	6,463	0.3	648,240	2.2
20 to 49 acres	922	15.9	29,530	1.5	2,017,134	6.7
50 to 99 acres	674	11.6	49,856	2.6	2,478,128	8.3
100 to 174 acres	1,581	27.2	241,983	12.5	7,901,482	26.4
175 to 259 acres	143	2.5	30,661	1.6	1,196,528	4.0
260 to 499 acres	268	4.6	94,441	4.9	3,393,875	11.3
500 to 999 acres	112	1.9	76,114	3.9	3,510,146	11.7
1,000 acres and over	71	1.2	1,399,912	72.3	5,888,042	19.7
Hay and grain	2,052	35.3	182,667	9.4	5,161,763	17.3
Vegetables	302	5.2	22,139	1.2	380,354	1.3
Fruit	93	1.6	11,825	0.6	798,048	2.7
Live stock	2,343	40.3	1,606,948	83.0	19,614,300	65.6
Dairy	472	8.1	48,145	2.5	2,108,135	7.0
Sugar	5	0.1	880	0.1	12,954	0.1
Flowers and plants	1	.....	1	.....	940	.....
Nursery stock	2	.....	64	.....	24,714	.....
Miscellaneous	539	9.4	62,658	3.2	1,805,669	6.0

TABLE 8.—AVERAGE VALUES OF FARM PROPERTY AND PRODUCTS, CLASSIFIED BY AREA AND PRINCIPAL SOURCE OF INCOME.

CLASS OF FARMS.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.					Products of 1899 not fed to live stock.
	Total.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.	
The Territory	$5,148	$1,965	$390	$132	$2,661	$1,064
Under 3 acres	2,918	140	85	46	2,647	760
3 to 9 acres	693	166	81	42	404	134
10 to 19 acres	1,281	429	176	58	618	257
20 to 49 acres	2,188	1,120	345	96	627	397
50 to 99 acres	3,677	1,916	423	145	1,193	702
100 to 174 acres	4,998	1,844	525	151	2,478	991
175 to 259 acres	8,367	4,397	584	309	3,077	1,682
260 to 499 acres	12,664	5,665	860	329	5,810	2,809
500 to 999 acres	31,341	10,858	1,153	421	18,909	6,512
1,000 acres and over	82,930	33,286	2,469	889	46,286	16,986
Hay and grain	2,515	1,727	267	130	391	644
Vegetables	1,259	812	171	80	196	417
Fruit	8,581	6,758	722	240	861	1,427
Live stock	8,372	2,217	442	140	5,573	1,710
Dairy	4,466	2,339	950	151	1,026	777
Sugar	2,591	2,053	246	110	182	348
Flowers and plants	940	630	300	10	.....	200
Nursery stock	12,357	9,250	2,625	175	307	1,850
Miscellaneous	3,350	1,246	205	95	1,804	408

Eight hundred and fourteen farms are reported as containing less than 3 acres. Of this number, 415 belong to Indians who cultivate small tracts of allotted land, generally irrigated. These tracts would have been rejected from consideration as farms, with few exceptions, had they been operated by Caucasians, but as they represent all the industrial operations of the families settled upon them the reports are retained. Otherwise no accounting would have been made of a large proportion of Indian farmers. The same remark applies to the 605 farms of Indians reporting areas of from 3 to 9 acres. Of the farms of white farmers with less than 3 acres, nearly all are those of individuals with considerable holdings of live stock at sufferance on the public domain or range. These farmers, who own or lease little or no land, are carrying forward agricultural operations of considerable magnitude, and must be included in the census of agriculture. The 814 farmers, with less than 3 acres each, have live stock of an average value of $2,647 and a reported average value of farm products in 1899 of $760. The average value of live stock on these farms is nearly equal to that for all farms, and the average value of products is greater than for any group of farms excepting those of over 174 acres.

FARMS CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

The farms of Arizona have been separated into 9 groups, according to their principal source of income. If 40 per cent of the reported value of the products not fed to live stock on any farm consists of hay and grain, the farm is designated as a hay and grain farm. In the same way, should 40 per cent of the products consist of vegetables and garden produce, the farm is designated as a vegetable farm. The basis for the classification of the other groups depends upon the same general principle.

Some of the leading facts concerning farms classified by source of income are given in Tables 7 and 8. These tables show that live-stock farms are the largest in size, and that they constitute 40.3 per cent of the number and 83.0 per cent of the area of all.

FARMS CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

Tables 9 and 10 present data relative to farms classified by reported value of products not fed to live stock. One of the groups for which statistics are given in these tables is that of farms not reporting any products not fed to live stock, and others are those with such products having values of less than $50, or with values of from $50 to $99. Most farms of the first class are just being opened on new land by white men, or are the lands of farmers who suffered loss by drought or by failure of their irrigation ditches, in 1899, or who have met with other misfortunes. In the reports of some of these farms the absence of crops indicates the failure of the enumerators to secure complete returns. The Indians constitute the larger part of the farmers whose farms are grouped in the second and third classes, although these groups include some farms similar to those described above as belonging to the first class.

TABLE 9.—NUMBER AND PER CENT OF FARMS, ACRES, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY REPORTED VALUE OF PRODUCTS.

CLASS OF FARMS.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUE OF FARM PROPERTY.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
The Territory	5,809	100.0	1,935,327	100.0	$29,906,877	100.0
Products, $0	360	6.2	38,449	2.0	803,130	2.7
Products, $1 to $49	825	14.2	24,727	1.3	518,080	1.7
Products, $50 to $99	669	11.5	24,058	1.2	526,620	1.8
Products, $100 to $249	986	17.0	79,811	4.1	1,797,200	6.0
Products, $250 to $499	833	14.3	82,828	4.3	2,007,640	6.7
Products, $500 to $999	844	14.5	98,230	5.1	3,158,152	10.6
Products, $1,000 to $2,499	783	13.5	126,778	6.5	5,660,000	18.9
Products, $2,500 and over	509	8.8	1,460,446	75.5	15,436,055	51.6

TABLE 10.—AVERAGE VALUES OF FARM PROPERTY AND PRODUCTS, CLASSIFIED BY REPORTED VALUE OF PRODUCTS.

CLASS OF FARMS.	AVERAGE VALUES PER FARM OF—					
	Farm property, June 1, 1900.					Products of 1899 not fed to live stock.
	Total.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.	
The Territory	$5,148	$1,965	$390	$132	$2,661	$1,064
Products, $0	2,231	905	128	57	1,141	.....
Products, $1 to $49	628	275	46	44	263	25
Products, $50 to $99	787	426	68	41	252	71
Products, $100 to $249	1,823	564	235	80	644	162
Products, $250 to $499	2,410	1,196	338	103	773	352
Products, $500 to $999	3,742	1,775	398	140	1,429	594
Products, $1,000 to $2,499	7,229	3,140	648	235	3,206	1,228
Products, $2,500 and over	30,326	9,381	1,533	420	18,992	8,243

The average size of the 360 farms with no reported income is 107 acres. They have an average live-stock investment of $1,141 and of all farm property of $2,231. The size of the next 2 groups (those with reported products valued at from $1 to $49 or from $50 to $99), is much smaller, as is the average value of their farm resources. The average area of the 509 farms with an income of over $2,500 is 2,869 acres, and the average value of investments is $30,326.

In Table 11 is given, by counties and Indian reservations, an exhibit of the most important facts relating to farms, farm areas, values, and expenditures.

The number of acres of land reported in farms in 1890 was 1,297,033, and in 1900, 1,935,327. In both reports are included 250,000 acres used for agricultural purposes, the title to which is now in controversy. In the report for 1900 are included some 50,000 acres of nontaxable land leased by the farmers. Of this about one-half is school and university land owned by the territory; the remainder is leased from Indians and Indian tribes.

GENERAL AGRICULTURAL CONDITIONS.

The surface of Arizona is divided into two clearly defined regions. The line between them, shown on the sketch map (page 2), extends from near the middle of the eastern boundary, northwest to the canyon of the Colorado. North of this line is a plateau with an elevation of from 5,000 to 8,000 feet. This plateau is mainly a level mesa, except where it is broken by the extrusion of groups of volcanic mountains rising above 7,000 feet, and in the San Francisco Mountains attaining an altitude of 13,000 feet. The climate of this plateau is typified by that of Flagstaff, which, in 1899,

TABLE 11.—NUMBER AND AREA OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900—EXPENDITURES AND VALUE OF PRODUCTS IN 1899.

COUNTIES AND INDIAN RESERVATIONS.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUE OF FARM PROPERTY.				EXPENDITURES.		Value of products not fed to live stock.
	Total.	With buildings.	Total.	Improved.	Land and improvements (except buildings).	Buildings.	Implements and machinery.	Live stock.	Labor.	Fertilizers.	
The Territory	5,809	4,464	1,935,327	254,521	$11,416,460	$2,266,500	$765,200	$15,458,717	$1,152,670	$2,921	$6,179,397
Apache	280	229	30,332	9,275	169,760	91,600	30,990	1,025,674	26,910	10	331,482
Cochise	252	226	62,992	10,576	496,510	134,850	46,140	2,827,569	104,100	60	576,727
Coconino	280	221	143,937	6,275	444,840	83,690	30,390	779,016	114,250	50	406,433
Gila	237	207	30,015	5,731	151,190	84,890	27,650	1,040,804	74,900	.....	254,487
Graham	509	474	172,570	20,761	1,371,339	261,170	89,070	1,589,784	137,520	51	696,424
Maricopa	1,089	1,041	170,716	118,230	5,216,696	803,110	236,270	1,935,426	282,490	2,550	1,491,272
Mohave	99	73	5,851	1,948	106,020	35,980	13,770	440,715	17,540	.....	109,040
Navajo	138	126	1,017,065	4,621	667,700	71,100	20,890	291,737	38,160	.....	396,617
Pima	252	238	71,172	9,399	583,770	158,100	40,160	1,478,143	103,260	.....	529,217
Pinal	237	219	45,767	15,777	423,280	148,080	45,990	678,409	67,110	50	252,697
Santa Cruz	113	105	50,289	4,431	363,690	70,920	21,670	791,183	26,360	.....	167,037
Yavapai	422	366	67,744	14,022	611,540	242,960	69,080	1,294,361	132,410	.....	564,709
Yuma	133	121	23,704	6,844	256,660	36,840	23,950	109,492	22,690	150	175,486
Colorado River[1]	52	45	136	136	4,665	930	40	12,033	.....	.....	8,031
Fort Apache[1]	395	2	2,060	1,521	34,090	10,300	22,830	66,805	500	.....	16,689
Gila Bend[1]	15	15	185	185	1,850	150	.....	1,964	.....	.....	1,357
Gila River and Salt River[1]	653	417	23,991	17,580	392,320	10,160	32,150	130,866	2,170	.....	65,876
Moqui[1]	450	246	3,168	2,821	25,270	11,840	7,800	190,704	.....	.....	41,057
Navaho[1,2]	1	1	598	598	3,000	3,000	140	629,974	.....	.....	36,423
Papago[1,3]	194	90	10,552	1,307	55,270	6,730	4,950	85,232	2,300	.....	38,976
San Carlos[1,2]	1	.....	2,000	2,000	25,000	.....	.....	54,090	.....	.....	13,810
Supai and Walapai[1]	7	2	483	483	12,000	100	720	4,836	.....	.....	5,520

[1] Indian reservation.

[2] One report for tribe; not an individual farm.

[3] Including nomadic Papago.

had a mean annual temperature of 45 degrees, or about that of Maine, and a rainfall of nearly 20 inches. This plateau descends abruptly along the escarpment indicated on the map, to a much lower region, consisting of broad valleys separated by narrow, steep ranges, having a surface varying in altitude from near the sea level to 3,000 feet. The climatic conditions in this region are typified by those of Phoenix, where the average temperature in 1899 was 69 degrees, or about that of New Orleans, and the rainfall 5 inches. On the plateau, except in a few regions where volcanic peaks increase the precipitation upon their slopes, the rainfall is insufficient for the successful cultivation of crops, and the main agricultural interest is grazing sheep and cattle. In the low country the rainfall is insufficient for this, and grazing is confined to certain favored mountain slopes. In that part of the territory the predominant industry, aside from mining, is agriculture, based upon irrigation, and its extent is dependent mainly upon the supply of water in the rivers and the facility with which it can be carried to the land.

LIVE-STOCK INTERESTS.

The vast extent of the plateau on which flocks and herds can be successfully grazed and the limited irrigated area, as shown on the sketch map, indicate conditions which give to live stock its dominant position. The capital invested in agriculture, June 1, 1900, was $29,906,877. Of this amount $15,458,717, or 51.7 per cent, was in live stock. For the United States, in 1890, the value of live stock constituted only 13.8 per cent of all agricultural capital.

CLASSIFICATION, NUMBER, AND VALUE OF LIVE STOCK.

For the census of 1900 a new classification of domestic animals has been adopted at the request of the various live-stock associations throughout the country. Neat cattle are grouped by age in accordance with their present and prospective relations to breeding or to the dairy industry. Horses and mules are classified by age, and sheep by age and sex. The new classification permits very close comparison with the figures obtained at preceding decennial periods.

Table 12 gives the number, age, and value of all live stock on farms and ranges, the average value of the same per head, and the number of domestic animals not on farms and ranges. The average value per head of horses and sheep is greatly reduced by the cheap stock on Indian reservations. Of the colts under one year, 56.8 per cent are reservation animals worth but $2.56 per head, while the average value for the rest of the territory is $6.72, and for Maricopa, the leading agricultural county, it is $16.41. The reservations also report over one-half of the horses in the territory one and under two years, their average value being $3.23, as compared with $11.70 outside of the reservations. Horses two years old and over are worth $11.37 each on the reservations, while for the remainder of the territory the average value is $21.27, and in Maricopa county it is $40.97.

TABLE 12.—NUMBER AND VALUE OF DOMESTIC ANIMALS, FOWLS, AND BEES, JUNE 1, 1900.

ANIMALS.	Age, in years.	ON FARMS AND RANGES.			Not on farms and ranges.
		Number.	Value.	Average value.	
					Number.
Calves	Under 1	135,181	$1,133,178	$8.38	322
Steers	1 and under 2	65,203	898,604	13.77	101
Steers	2 and under 3	42,116	743,845	17.66	64
Steers	3 and over	30,577	666,953	21.81	49
Bulls	1 and over	20,437	483,411	23.65	14
Heifers	1 and under 2	73,437	961,818	13.10	127
Cows kept for milk	2 and over	17,965	577,693	32.16	673
Cows and heifers not kept for milk.	2 and over	357,719	5,901,964	16.50	888
Colts	Under 1	18,976	82,610	4.35	170
Horses	1 and under 2	22,283	152,878	6.86	111
Horses	2 and over	83,804	1,466,417	17.50	6,109
Mule colts	Under 1	445	7,273	16.34	6
Mules	1 and under 2	552	13,384	24.25	7
Mules	2 and over	3,080	102,882	33.40	718
Asses and burros	All ages	4,625	32,162	6.95	1,466
Lambs	Under 1	193,303	284,858	1.47	5
Sheep (ewes)	1 and over	452,271	1,061,358	2.34	60
Sheep (rams and wethers).	1 and over	216,187	491,578	2.27	58
Swine	All ages	18,103	80,587	4.45	712
Goats	All ages	98,403	167,863	1.71	1,591
Fowls:[1]					
Chickens[2]		165,200	80,798		
Turkeys		6,043			
Geese		840			
Ducks		2,439			
Bees (swarms of)		18,991	66,603		
Value of all live stock			15,458,717		

[1] The number reported is of fowls over 3 months old. The value is of all, old and young.
[2] Including Guinea fowls.

The relative number of calves and lambs reported is small, though slightly larger than in 1890. The spring round-up in some sections had not been completed before enumeration, and many young animals were omitted. In addition, calves dropped in the summer or fall of 1899 were doubtless reported as yearlings, and lambs of the same age, as sheep, in accordance with local custom.

The progress of live-stock interests since 1870 is shown in Table 13. Calves and lambs are not included in the number of neat cattle and sheep for 1900, as it is probable they were excluded from the numbers for the earlier years.

TABLE 13.—NUMBER OF NEAT CATTLE AND SHEEP, AND VALUE OF ALL LIVE STOCK.

CENSUS YEAR.	Number of neat cattle.	Number of sheep.	Value of live stock.	PER CENT OF INCREASE.		
				Neat cattle.	Sheep.	Value of live stock.
1900 a	607,454	668,458	$15,458,717			
1900 b	592,316	385,578	14,175,429	105.6	276.4	335.1
1890	268,122	102,427	3,257,660	496.1	33.8	178.9
1880	44,983	76,524	1,167,989	776.5	9,429.8	711.1
1870	5,132	803	143,996			

The relative increase in the number of horses, mules, asses, swine, and goats from 1890 to 1900 approximates that for sheep. The increase in the value of live stock is somewhat greater than the increase in number, reflecting the well-known fact that owners of live stock in the West

have been diligently improving the breed and quality of all their domestic animals since 1890. Improved transportation facilities also have had a favorable influence upon values.

Of neat cattle 97.8 per cent grazed in part or wholly upon the public domain or range, and are classed as "range cattle." The per cent of sheep pastured under similar conditions was 99.9+.

ANIMAL PRODUCTS.

The quantities and values of wool, mohair, dairy products, and other animal products, including the value of animals and fowls sold and slaughtered for food, are given in Table 14. The total value of all such products is $4,522,801, or 73.2 per cent of the farm income of 1899.

TABLE 14.—QUANTITIES AND VALUES OF ANIMAL PRODUCTS, JUNE 1, 1900, AND ANIMALS AND FOWLS SOLD AND SLAUGHTERED ON FARMS IN 1899.

PRODUCT.	Unit of product.	Quantity.	Value.
Wool	Pounds	3,340,637	$424,158
Mohair and goat hair	Pounds	27,030	7,326
Milk	Gallons	3,056,109	
Cream	Gallons	5,643	540,700
Butter	Pounds	379,311	
Cheese	Pounds	33,305	
Eggs	Dozens	819,507	163,486
Poultry			114,884
Honey	Pounds	930,420	67,489
Wax	Pounds	13,080	
Animals sold			2,908,745
Animals slaughtered			296,013
Total			4,522,801

DAIRY COWS AND PRODUCTS.

The dairy interests are increasing in importance with every decade. In 1890 the milch cows numbered 4,874; in 1900, 17,965. This is an increase of 268.6 per cent. The total production of milk in 1889 was 709,225 gallons, or 145 gallons per cow. In 1899 the total was 3,056,109, or 170 gallons per cow. The total production of milk increased 330.9 per cent.

Dairy products to the value of $255,332 were consumed on farms; the remainder of the total value of $540,700 represents the products sold.

CROPS OF 1899.

TABLE 15.—ACRES, QUANTITIES, AND VALUES OF THE PRODUCTS OF 1899.

PRODUCTS.	Acres.	Unit of measurement.	Quantity.	Value.
Barley	16,270	Bushels	458,776	$223,985
Corn	11,654	do	204,748	151,564
Oats	1,641	do	43,246	21,144
Rye	15	do	190	157
Wheat	24,377	do	440,252	276,639
Clover seed		do	1,697	6,918
Other grass seed		do	55	40
Hay and forage crops	92,674	Tons	177,831	1,361,422
Potatoes	626	Bushels	33,927	33,928
Sweet potatoes	51	do	4,299	4,636
Onions	47	do	6,966	10,827
Other vegetables	2,145			124,791
Orchard fruits		Bushels	112,726	96,764
Small fruits		Quarts	129,470	12,265

TABLE 15.—ACRES, QUANTITIES, AND VALUES OF THE PRODUCTS OF 1899—Continued.

PRODUCTS.	Acres.	Unit of measurement.	Quantity.	Value.
Grapes		Centals	16,972	[1]$24,779
Subtropical fruits				30,725
Nuts				9,312
Flowers and nursery stock	16			3,149
Cotton	20	Pounds	22,600	814
Tobacco		do	100	25
Hops		do	600	21
Broom corn	30	do	21,100	937
Peanuts	4	Bushels	234	238
Dry beans	805	do	6,637	12,700
Dry peas	50	do	866	1,205
Sunflower seed	92	do	1,000	1,000
Miscellaneous crops				5,510
Forest products				51,392
Sugar cane and sirup				848
Sorghum cane and sirup				6,561
Total				2,474,296

[1] Including value of raisins, wine, etc., made therefrom.

The total value of the various crops produced in 1899 was $2,474,296. The total value of farm products, including the animals sold or slaughtered for food, was $6,997,097. In this total are included the products fed to live stock on the farms of the producers. Deducting this from the general total to avoid duplication, the gross income of farms in 1899 was $6,179,397, which is referred to in this bulletin under the general designation of "Products not fed to live stock."

POOR CROPS OF 1899.

The effect of the reduced rainfall is plainly manifest in the returns for cereals and potatoes, and is most evident in the statistics for hay and forage. The failure of the irrigation ditches in some sections to furnish sufficient water to mature crops led the farmers to cut many acres of cereals for hay which would otherwise have been harvested for grain. The acreage of cereals reported is, therefore, much less than was sown for grain, and the average yield per acre is also below that of the ordinary year. The lack of water on the grazing plains of the northern section caused an unusually large movement of stock to the green and irrigated alfalfa fields of some of the lower counties, notably Maricopa. A great portion of the alfalfa grown in 1899 in that county was cut but twice, and some of it but once. The fields sown to this crop were used in the latter part of the year as pasture. The drought reduced also the average yield of uncultivated grasses, of which a large area was cut in the census year.

Coconino county reported 405 of the 626 acres of potatoes grown in Arizona in 1899. This was 64.7 per cent of the total. Potatoes in Coconino are grown generally without irrigation, and the effect of the drought is seen in the fact that the average yield for the county was only 37 bushels per acre, while in 1889 the yield in the same section was 87 bushels. The fields where potatoes were grown under irrigation furnished a greater yield for 1899 than ten years before. The drought reduced the yield in Coconino and greatly modified the average production in the territory.

GENERAL REVIEW OF TABLES.

The production of cereals increased, outside of the Indian reservations, 110 per cent. Including the reservations, the acreage of hay and forage increased 231.4 per cent; and the tons harvested, 178.1 per cent. The value of garden products, exclusive of potatoes and inclusive of small fruits, was 345.9 per cent greater in 1899 than ten years before. The acreage of potatoes increased 53.8 per cent, but the actual product obtained was less in 1899 than in 1889. The growing of grapes and orchard and subtropical fruits has developed into an important industry. The number of orchard trees of bearing age is 325.4 per cent, and the product 442.4 per cent greater than in 1889. Of subtropical fruit and nut trees the last decade records a marked increase, and the products, which were very small in 1889, have become a considerable item in the farm income of 1899. The tables show an increase in the number of fowls since 1890 of 182.4 per cent, and an increase in the number of dozens of eggs produced per fowl from 3.3 in 1889 to 4.7 in 1899.

Ostrich farming is a new and promising industry. A company organized in 1898, near Phoenix, with 104 birds, now owns the largest farm of African ostriches in the United States.

FLOWERS, PLANTS, SEEDS, AND NURSERY STOCK.

In the semitropical climate of Arizona, where all but the most delicate flowers and plants thrive in the open without danger from frost, it is not to be expected that commercial floriculture should attain any considerable degree of importance as an industry. Two florists' establishments were reported in 1899, 1 in Cochise and 1 in Santa Cruz county, with a total amount of sales for the year of $235. In 1899 there were under glass 670 square feet of land, of which 220 square feet were devoted to the culture of flowers and plants, and the remainder to the forcing of certain classes of vegetables.

The rapid development of horticulture during the past decade has caused a corresponding increase in the number of nurseries devoted to the propagation of young trees. In 1889, 3 nurseries were reported. These were presumably of recent establishment, as no sales were given. In 1899 there were reported, in all, 8 establishments, covering 14 acres of land, and having a gross income of $2,914 from sales for the year. Of these establishments, only 2 made the raising of nursery stock their principal business. The other 6 raised a few trees and plants in addition to ordinary farm products.

IRRIGATION STATISTICS.

Arizona has been inhabited at different times by three races, each making use of irrigation in agricultural operations. Of the first, or prehistoric, race very little is known. Evidences abound that it inhabited Arizona for an extended period, and had vanished before the advent of the white man in America. In Maricopa and other counties are found traces of this race, and the present canals and ditches for irrigation in many places follow closely the lines laid down centuries ago. When the region was explored by white men the agricultural Indians were practicing irrigation of a primitive kind, very much as do their present successors. The white settlers have improved on these methods, and population, agricultural development, and wealth have advanced on lines parallel with the artificial application of water to the cultivation of the soil. The sketch map represents, by areas, in solid black, the main regions in which irrigation has been successfully applied to any considerable extent.

Of the 72,268,800 acres of land surface of Arizona, only 1,935,327, or 2.7 per cent, are included in farms in 1900, and only 254,521, or 0.35 per cent, are improved. Of the improved land, 227,890 acres are located outside of the Indian reservations. The importance of irrigation is demonstrated by the fact that irrigated land outside of the Indian reservations has an acreage of 185,396, or 81.4 per cent of the corresponding improved land. The progress of agriculture during the decade ending with 1900 is attributable to the successful application of irrigation to the growing of hay and forage, cereals, vegetables, fruits, and other crops.

Within the ten years from 1890 to 1900, 545 miles of canals and ditches were constructed, at a cost of $1,508,469. Out of this total, $512,000 was expended in ditches into which no water had been turned before June 1, 1900. Aside from this amount, $250,000 is represented in canals which were completed within the last few years, and which utilize only a small quantity of the water appropriated for them. The acreage under these ditches, which in the near future will be brought under cultivation, will undoubtedly be much larger than the area now irrigated by all the ditches constructed since 1889. In 1890 the acres irrigated, outside of the reservations, numbered 65,821; in 1900 they numbered 185,396. By the opening of new ditches and canals between 1890 and 1900, 26,297 acres were added to the irrigated area. By the enlargement of the canals previously constructed, and as the result of more intelligent methods of water distribution, 93,278 acres were added to the productive area of the territory. The total increase in irrigated land in ten years was 119,575 acres. Most of this land was public domain in 1890.

At a low estimate its present average value is $30 per acre, or $3,587,250. Irrigation has added this large

amount to the farm wealth of the territory. The relation of irrigation to the various agricultural operations can be noted in the following table:

TABLE 16.—ACRES AND YIELD OF ALL CROPS AND OF IRRIGATED CROPS, 1899.

CROPS.	TOTAL, IRRIGATED AND UNIRRIGATED.		IRRIGATED.		Per cent irrigated.
	Acres.	Bushels.	Acres.	Bushels.	
Barley	16,270	458,776	16,064	455,336	98.7
Corn[1]	11,654	204,748	7,246	135,860	62.2
Oats	1,641	43,246	1,602	42,711	97.6
Rye	15	190	15	190	100.0
Wheat	24,377	440,252	24,137	436,582	99.0
Potatoes	626	33,927	139	14,360	22.2
Sweet potatoes	51	4,299	51	4,299	100.0
Onions	47	6,966	43	6,293	91.5
Alfalfa	62,585	[2]137,270	62,585	[2]137,270	100.0
Grains cut green for hay	15,349	[2]20,487	11,202	[2]16,007	73.0
Other hay	14,740	[2]20,074	6,576	[2]12,501	44.6
Vegetables[3]	2,145		2,145		100.0
Small fruits	79		79		100.0
Grapes	[4]685		685		100.0
Orchard fruits	[4]2,295		2,295		100.0
Subtropical fruits and nuts	[4]1,149		1,149		100.0
Other crops	1,309		1,220		93.2

[1] A large portion of the acreage of unirrigated corn was in the Indian reservations, and was in very small tracts near water courses and springs.
[2] Tons.
[3] Other than potatoes, sweet potatoes, and onions.
[4] Estimated from number of trees or vines.

The total number of acres of irrigated crops, as given above, is 137,233, while the total number of acres of land irrigated is 185,396. The difference of 48,163 acres represents approximately the area of pasture land irrigated. It is probable that a portion of the area upon which crops were reported as grown without irrigation, was really irrigated at some time during the year.

TABLE 17.—NUMBER OF IRRIGATORS AND ACRES IRRIGATED.

COUNTIES.	NUMBER OF IRRIGATORS.			ACRES IRRIGATED.		
	1899.	1889.	Per cent increase.	1899.	1889.	Per cent increase.
The Territory[1]	2,981	1,075	177.3	185,396	65,821	181.7
Apache	215	182	80.8	7,372	5,545	87.2
Navajo[2]	114			3,007		
Cochise	126	52	142.3	4,989	2,372	110.3
Gila	162	18	800.0	3,924	815	381.5
Graham	462	199	132.2	18,297	7,556	142.2
Maricopa	1,038	327	217.4	109,655	35,212	211.4
Mohave	58			1,419		
Pima	186	85	208.2	8,617	3,085	262.4
Santa Cruz[3]	76			2,562		
Pinal	160	115	39.1	11,297	6,919	63.3
Yavapai	244	91	223.1	8,730	3,762	161.7
Coconino[4]	50			1,114		
Yuma	90	6	1,400.0	4,413	555	695.1

[1] Exclusive of Indian reservations.
[2] Created since 1889 from Apache county.
[3] Created since 1889 from Pima county.
[4] Created since 1889 from Yavapai county.

A glance at the percentages of Tables 1 and 17 discloses the intimate relation between the growth of irrigation and the general development of agriculture. The number of farms outside of Indian reservations increased in ten years 183.3 per cent; the irrigators, 177.3 per cent; and the irrigated area, 181.7 per cent.

Table 18 gives certain statistics of irrigation by counties, exclusive of Indian reservations.

TABLE 18.—IRRIGATED FARMS AND ACRES, JUNE 1, 1900.

COUNTIES.	NUMBER OF FARMS.			NUMBER OF ACRES IN FARMS.		Per cent improved land irrigated.
	Total.	Irrigated.	Per cent irrigated.	Improved.	Irrigated.	
The Territory[1]	4,041	2,981	73.8	227,890	185,396	81.4
Apache	280	215	76.7	9,275	7,372	79.4
Cochise	252	126	50.0	10,576	4,989	46.2
Coconino	280	50	17.9	6,275	1,114	17.7
Gila	237	162	68.3	5,731	3,924	68.4
Graham	509	462	90.7	20,761	18,297	88.1
Maricopa	1,089	1,038	95.3	118,230	109,655	92.7
Mohave	99	58	58.5	1,948	1,419	72.8
Navajo	138	114	82.6	4,621	3,007	65.0
Pima	252	186	73.8	9,399	8,617	91.7
Pinal	237	160	67.5	15,777	11,297	71.6
Santa Cruz	113	76	67.2	4,431	2,562	57.8
Yavapai	422	244	57.8	14,022	8,730	62.2
Yuma	133	90	67.6	6,844	4,413	64.4

[1] Exclusive of Indian reservations.

Of the farms, 73.8 per cent are irrigated, while of improved land, 81.4 per cent is irrigated. The average number of acres of improved land in each irrigated farm is 76, of which 62 are irrigated.

In addition to surface water obtained from rivers, Arizona possesses considerable quantities of ground water, or so-called underflow, at depths varying from 40 to 1,500 feet. Seventy-seven farms were wholly or in part supplied with this ground water by pumping from wells. In this way 974 acres were irrigated. The use of wells to augment the supply of water in the ditches, or by pumping the water directly upon the land, is becoming more general each year, and in sections where an artesian supply is abundant a considerable area of land above the line of ditch ultimately will be reclaimed and rendered productive and valuable.

TABLE 19.—NUMBER, LENGTH, AND COST OF IRRIGATION DITCHES REPORTED.

COUNTIES.	NUMBER, LENGTH, AND COST OF DITCHES.			NUMBER OF ACRES OF LAND.		
	Number.	Length in miles.	Cost of construction.	Under ditches.	Irrigated, 1899. Total.	Irrigated, 1899. Average per mile of ditch.
The Territory[1]	519	1,492	$4,408,158	883,140	185,396	124
Apache	37	80	73,756	15,335	7,372	92
Cochise	36	51	27,561	7,565	4,989	98
Coconino	7	8	9,280	1,359	1,114	139
Gila	40	64	18,767	7,051	3,924	61
Graham	35	138	127,286	29,928	18,297	133
Maricopa	31	442	3,080,000	643,743	109,655	248
Mohave	34	35	10,670	1,807	1,419	41
Navajo	12	39	127,200	7,045	3,007	77
Pima	42	106	40,340	9,732	8,617	81
Pinal	41	127	521,200	35,281	11,297	89
Santa Cruz	29	40	20,907	5,295	2,562	64
Yavapai	167	298	151,191	22,778	8,730	29
Yuma	8	64	200,000	96,221	4,413	69

[1] Exclusive of Indian reservations.

No reports were secured concerning the cost of irrigation ditches in the Indian reservations. The statistics presented in Table 19 relate only to the canals and ditches in the counties outside of the reservations. The number of acres of irrigated land for each mile of ditch reported averages 124. The number of acres under ditch for each mile is 591, or nearly five times the present irrigated areas. The ditches furnished with sufficient water supply, properly administered, are therefore able to increase the cultivable area in nearly that proportion. The average cost of constructing the ditches was about $2,954 per mile, $5 per acre of land under ditch, and $24 per acre for the land actually irrigated in the year 1899. In explanation of the high average of $24 per acre for all land irrigated in 1899, mention should be made of a number of facts. Some of the ditches included in the tabulation were not completed sufficiently early in 1899 to deliver water to aid in maturing crops for that year. From others no adequate returns have been received for the large sums expended in their construction, because of lack of water supply. Not all the investments in irrigation ditches have been profitable, and not all have been wisely made. The disappointments which have followed many notable attempts to reclaim large areas of arid land have nearly always been due to the failure on the part of those concerned to give proper consideration to the subject of water supply. Such failures are reflected in the high average cost of irrigation canals per acre of irrigated land, and the average is made to appear much greater than it actually is, by including in the table ditches not completed and delivering water in 1899. For ditches wisely planned and economically constructed, the average cost per irrigated acre does not vary much from the average cost of water rights, $9.50, as stated in Table 20.

TABLE 20.—AVERAGE VALUE PER ACRE OF IRRIGATED AND UNIRRIGATED FARMS, JUNE 1, 1900.

COUNTIES.	AVERAGE VALUE PER ACRE, EXCLUSIVE OF BUILDINGS.					AVERAGE COST FOR WATER PER ACRE.	
	All farms.	Unirrigated farms.	Irrigated farms.	Irrigated land.	Unirrigated arable land.	Water rights.	Annual maintenance.
The Territory[1]	$5.74	$1.23	$17.67	$43.50	$7.73	$9.50	$0.82
Apache	5.59	1.46	6.12	17.35	1.98	6.11	.52
Cochise	7.88	6.10	10.15	30.66	2.84	4.59	.75
Coconino	3.09	2.77	12.73	20.59	1.25	8.33	1.08
Gila	5.03	2.61	6.72	39.46	2.89	4.80	.83
Graham	7.95	2.18	18.29	49.46	5.42	5.18	.80
Maricopa	30.56	1.63	31.49	54.23	10.80	11.13	.78
Mohave	18.12	8.18	20.32	19.61	1.25	11.21	.60
Navajo	.66	.54	7.12	31.93	1.31	23.21	1.40
Pima	8.20	.73	10.79	70.40	4.52	22.02	.84
Pinal	9.25	4.54	11.11	23.60	4.00	7.54	.99
Santa Cruz	7.23	1.86	7.98	15.34	1.26	8.90	.20
Yavapai	9.02	5.97	10.93	43.03	1.35	8.98	1.10
Yuma	10.82	5.87	11.95	54.65	1.25	5.09	1.25

[1] Exclusive of Indian reservations.

The average value of arable land under ditch, but not yet prepared for irrigation, is $7.73 per acre, while that of good irrigated land is $43.50. The difference, $35.77, is the average value per acre added by irrigation. There has been a large profit over the cost of ditch construction—$24 per irrigated acre. This profit would have been much larger and the cost per irrigated acre materially less if the ditches had been constructed only after due consideration of the factors involved.

Of the 5,809 farms in the territory, including those in the Indian reservations, 4,210 are irrigated and 1,599 are unirrigated. The acres in the irrigated farms number 558,821; in the unirrigated, 1,376,506. The value of all land in the irrigated farms, not including buildings, is $9,614,352, and of the unirrigated, it is $1,802,108. The value of all buildings on irrigated farms is $1,822,322, and for the unirrigated, $444,178. Live stock on the irrigated farms has a value of $8,500,067, and on unirrigated, $6,958,650. The irrigated farms are 72.5 per cent of all; the corresponding percentage of acres is 28.9; that of the value of land and improvements, exclusive of buildings, 84.2; buildings, 80.4; implements and machinery, 85.7; live stock, 55; and the total of all these forms of farm wealth, 69 per cent.

The average size of all farms, exclusive of holdings by Indians, is 468 acres; the average size of irrigated farms is 175 acres; and the average amount of irrigated land on each irrigated farm is 62 acres. On the farms making use of irrigation, the average value of products not fed to live stock is $7 per acre. The unirrigated farms make greater use of the public domain for grazing purposes than do those which are irrigated, and from that source secure an income not directly obtained from the land inclosed in farms. Nevertheless, the average value per acre of products not fed to live stock on unirrigated farms in 1899 is only $1.79.

In the counties outside of the Indian reservations the average value per acre of land, exclusive of buildings, is, for all farms, $5.74; for unirrigated farms, $1.23; and for irrigated farms, $17.67. The average value of irrigated land per acre is $43.50, while that for the best irrigated land, suitable for growing alfalfa, is from $60 to $200 per acre. Irrigated fruit land is even more valuable.

There are relatively but two river systems, the Colorado and the Gila. The drainage area of the former and its tributaries, the Rio de Chelly, Little Colorado, Cataract Creek, and Bill Williams Fork, comprises about one-half the territory. The other half, far more important, agriculturally considered, is embraced by the Gila, with its numerous confluents, each of which is of sufficient prominence to deserve consideration as a separate system, possessing an independent, though tributary, watershed of its own. These tributary members are the Upper Gila watershed, the San Pedro and Santa

Cruz watersheds, the Verde, Salt, Agua Fria, Hasayampa, and Lower Gila. Within this area the agricultural wealth of Cochise, Gila, Graham, Maricopa, Pima, Pinal, Yavapai, and Yuma counties is practically embraced.

Flowing in deeply eroded canyons through regions mainly of high plateaus, the Colorado and its branches are rarely available for irrigation purposes except in the southern portions of its watershed, where narrow valleys and basins are found. A review of the progress of irrigation is therefore confined very largely to the watershed of the Gila, wherein the greatest agricultural development has been shown. The region tributary thereto lends itself much more readily and cheaply to the construction of canals and ditches, and comprises far more available land which will ultimately be reclaimed than the drainage area of the Colorado and its affluents. Within this area lie the principal irrigated portions of Arizona, and in it are found the largest and most important irrigation systems. This section of Arizona resembles southern California more closely than it does any other portion of the United States. In many essentials it is not unlike certain districts on the southern and western shores of the Mediterranean, where irrigation is older than the history of the race which now inhabits it. Without irrigation, this part of Arizona is a semitropical desert; with irrigation, it is capable of sustaining a dense population, limited only by the water supply that can be secured by ditches, reservoirs, and wells, and by the wisdom shown in the distribution of water thus obtained.

The development of the territory by reclaiming its arid but fertile land presents problems of water storage of great importance. Their solution is simplified by the fact that the small precipitation of rain takes place during two plainly marked rainy seasons. In winter the rains begin to fall in December, and the precipitation, while not great, is quite sufficient to cause floods in the streams. The summer rains fall in July, August, and throughout September, and their amount and intensity are considerably in excess of those falling in winter.

While no reservoirs of importance have yet been constructed in the territory, the future reclamation of large areas of fertile lands depends upon the storage of flood waters on the sites which nature has provided. When perfected, these reservoirs should be sufficiently extensive to provide water that will last through temporary droughts. They must be provided with enormous waste ways to safely discharge the torrential rainfalls which are not uncommon.

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